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ABSTRACT

Results of the research reported in this paper suggest that the development of mentally handicapped preschool children may not be measurable in distinct cognitive, social/emotional, physical motor, and language areas. This research further indicates that a testing instrument designed to measure the generalized factors of intelligence and social adaptability in a classroom setting may be sufficient for the identification of the mentally handicapped child prior to his (her) first public school experience. This paper highlights the results of an effort to determine the predictive power of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI), the Denver Developmental Screening Test, the Leiter International Performance Scale, the Southeastern Day Care Project (HEW) Rating Scale, and the ABC Inventory when used to diagnose mentally handicapped children in the areas of preschool cognitive, social/emotional, physical motor, and language development. The specific objective of the research is to determine if mentally handicapped preschool youngsters really need to be tested in all four areas of development in order to accurately predict which children require individual help prior to public school kindergarten placement. (Author/DEP)

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# THE POWER OF SELECTED COGNITIVE, SOCIAL/EMOTIONAL, PHYSICAL MOTOR, AND LANGUAGE TESTS IN PREDICTING DEVELOPMENT LEVELS OF MENTALLY HANDICAPPED PRESCHOOL CHILDREN

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ABSTRACT

Title

The power of selected cognitive, social/emotional, physical motor, and language tests in predicting development levels of mentally handicapped preschool children

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Content

This paper highlights the results of an effort to determine the predictive power of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI), the Denver Developmental Screening Test, the Leiter International Performance Scale, the Southeastern Day Care Project (HEW) Rating Scale, and the ABC Inventory when used to diagnose mentally handicalled children in the areas of preschool cognitive, social/emotional, physical motor, and language development. The specific objective of the research was to determine if mentally handicapped preschool youngsters really needed to be tested in all four areas of development in order to accurately predict which children required individual help prior to public school kindergarten placement.

Independent (predictor) study variables included scores obtained using the five above-itemized tests during September, 1974. Dependent study variables included preschool teacher ratings of each child in the areas of cognitive, social/emotional, physical motor, and language development after one year of preschool experience (June, 1975). All data were obtained from the cumulative pupil files of 29 children enrolled in the Saginaw County (Michigan) Project PAR.

Data analysis was performed according to accepted multivariate procedures and included (in order) a descriptive analysis of the eleven variable scores obtained from the testing, a stepwise discriminant analysis using prediction variables until the partial F's cropped below a value of one, a second stepwise discriminant analysis using variables remaining, a series of factor analyses of variables retained in the two discriminant analyses, and a final discriminant analysis using the variables of the final factors retained.

Results of the research indicated that the five predictive instruments under study measured two factors; one termed a generalized measure of intelligence, and the other termed a social measure of classroom adaptability. Results also indicated that these two factors could be measured with a high degree of precision (89% correct classification) using only the WPPSI and Leiter tests for generalized intelligence, and the Southeast Day Care Project (HEW) scale for social adaptability.

This research is significant because it indicates that the development of mentally handicapped preschool children may not be measurable in district cognitive, social/emotional, physical motor, and language areas. It further indicates that a test measuring the generalized factors of intelligence and social adaptability in a classroom setting may be sufficient for the identification of the mentally handicapped child prior to his first public school experience.

THE PAPER

Introduction:

The research described in this paper focuses on a concern that many educators face, the accurate screening of children prior to providing diagnostic care. One of the methods often suggested at the time of initial entrance referral is the administration a test battery designed to identify children in most need of assistance. Often, these tests are given simply because of the reputation they have for discriminating between traits and abilities of individuals in need of help.

The Saginaw County (Michigan) Child Development Centers, Inc. began a substantial screening effort in September, 1974 using five individual developmental tests of cognitive, social, physical motor, and language abilities.

With the assistance of a grant from the Bureau of Education for the Handicapped (BEH-OEC-0-74-0541), the Project PAR staff administered the following tests on an individual basis to 29 preschool children.

These tests included:

1. The Wechsler Preschool and Primary Scale of Intelligence (WPPSI)
2. The Denver Developmental Screening Test
3. The Leiter International Performance Scale (Revised Edition)
4. The Southeastern Day Care Project (HEW) Rating Scale
5. The ABC Inventory

Each of these instruments was selected by the Project PAR Advisory Council after considerable study. Major selection criteria of the council included such factors as ease of administration and validity in a non-verbal context.

In order to determine if mentally handicapped preschool youngsters really needed to be tested in four developmental areas using five test instruments, each youngster was monitored throughout his first preschool year with a structured teacher rating scale (see appendix).

Four scales were prepared for teacher use. Each scale consisted of behavioral observation checklist items in Likert format. Teachers were first instructed in how to use each scale, then were asked to rate each child in the areas of cognitive, social/emotional, physical motor, and language development upon entering the program and at the end of the first instructional year. The checklist was developed through a study of children successfully mainstreamed into regular kindergarten programs. The behaviors rated on the checklist were those thought to be most crucial to the success of PAR children by the project director, his Advisory Council, and other project consultants. A copy of the checklist is appended to this paper.

Procedures:

The specific objective of this research was to determine if mentally handicapped preschool youngsters really needed to be tested in all four areas of development in order to accurately predict which children required individual help prior to public school kindergarten placement.

Independent (predictor) study variables included scores obtained from the following instruments in September, 1974:

1. The Wechsler Preschool and Primary Scale of Intelligence (WPPSI)
2. The Denver Developmental Screening Test

3. The Leiter International Performance Scale

4. The Southeastern Day Care Project (HEW) Rating Scale

5. The ABC Inventory

Dependent study variables included preschool teacher ratings of each child recorded on a five point Likert scale in the areas of cognitive, social/emotional, physical motor, and language development after one year of preschool experience (June, 1975).

All data were obtained from the cumulative pupil files of 29 children enrolled in the Saginaw County (Michigan) Project PAR program from September, 1974 through June, 1975.

All test scores and observation checklist ratings were assumed to be interval measures and analyzed according to accepted statistical procedures. Frequency distributions, cross tabulations, and correlations of all study variables were first obtained. Output was reviewed at a descriptive level to determine if the variability within measures and the correlation between variables would permit further analysis.

A review of the generated descriptive statistics supported the conclusion that more intensive investigations could be made. Alternative discriminant and factor analyses were then performed in the following order:

| Steps | Analyses |
|---|---|
| 1 | Stepwise discriminant analysis using all prediction variables until the partial F's cropped below a value of one. |

| Steps | Analyses |
|---|---|
| 2 | A second stepwise discriminant analysis using variables remaining from step 1 |
| 3 | A series of factor analyses of variables retained in steps 1 and 2 |
| 4. | A third discriminant analysis using retained variables of step 3 |

The above statistical procedures are recommended by Amick and Walberg (1975:236-255) when the researcher is interested in finding those variables within a select test battery that contain the most predictive information.

Results:

Statistical analysis reported in this paper suggest that the five predictive instruments under study measured two factors; one termed a generalized measure of intelligence, and the other termed a social measure of classroom adaptability. Results of analysis also indicated that these two factors could be measured with a high degree of precision (89% correct classification) using only the WPPSI and Leiter tests for generalized intelligence, and the Southeast Day Care Project (HEW) scale for social adaptability.

Three test scores accounted for most of the variability of all tests measuring general intelligence. These tests were the WPPSI, Leiter, and HEW (cognitive subtest). After VARIMAX rotation of factors, approximately equal commonality was noted using the WPPSI and Leiter batteries.

The HEW battery (gross-fine motor and self-help subtests) accounted for most of the variability of all tests measuring social adaptive development. VARIMAX and QUARTIMAX factor rotations strongly indicate that the HEW battery provided essentially as much information about the social-emotional development of PAR youngsters as all other batteries.

It is interesting to also note that no clear factors emerged in the physical motor or language development areas. Although the HEW and Denver batteries claim to measure these dimensions, they did not emerge in this research.

Using the above information, together with a series of step-wise discriminant analyses, it was determined that the use of the Leiter and WPPSI intelligence tests correctly classified 83% of the PAR children when staff cognitive development evaluations were used as a base. Thus, the use of these two tests accounted for the same approximate predictive power as the use of the WPPSI, Leiter, ABC, HEW, and Denver batteries combined.

Using only the HEW battery, successful classifications occurred in 79% of the cases using staff social-emotional evaluations as a base. In other words, the use of the HEW battery alone produced as much predictive power as the use of the HEW and Denver batteries combined.

Although all measuring devices did not exhibit common factors in the physical motor and language development areas, further discriminant analysis did show that the HEW battery (gross-fine motor and self-help subtests) successfully classified 88% of the PAR children according to staff standards in physical-motor performance. Only the ABC battery alone successfully differentiated PAR youngsters (84%) on the basis of staff standards in the area of language development.

Copies of computer printouts summarizing primary discriminant analysis statistics may be obtained through the principal author (LaBay).

Statistics included in the printouts are:

1. List of all variables entered by step
2. Variables kept or removed from analysis with corresponding Wilks' Lambda, Rao's V and significance values
3. List of identified discriminant functions with corresponding eigenvalues, relative percentage of the eigenvalue associated with the function, cononical correlation between the discriminant function and the dummy variable set, and associated Wilks' Lambda's.
4. Standardized discriminant function coefficients and group centroids

Important statistics associated with factor analyses may also be verified through the principal author. Statistics available on request are:

1. Correlation matrices
2. Estimates of commonality by factor with corresponding eigenvalues
3. VARIMAX and QUARTIMAX statistics including rotated factor matrices per iteration, transformation matrices, and factor score coefficients.

Conclusions:

Results of the research reported in this paper suggest that the development of mentally handicapped preschool children may not be measurable in distinct cognitive, social/emotional, physical motor, and language areas. This research further indicates that a testing instrument designed to measure the generalized factors of intelligence and social adaptability in a classroom setting may be sufficient for the identification of the mentally handicapped child prior to his (her) first public school experience.

## REFERENCES

Amick, Daniel J. and Walberg, Herbert J.
Introductory Multivariate Analysis:
McCutchen Publishing Corporation, 1975.

APPENDIX

PAR Referral Form used
as Dependent Variable
Measure Source

SAGINAW COUNTY
CHILD DEVELOPMENT CENTERS, INC.

PROJECT PAR REFERRAL FORM

Child's Name _____ Birthday _____
mo day year

Parent's Name _____

Address _____ Phone _____

Name of person making referral _____

Agency _____ Phone _____

Have parents been informed of referral? Yes _____ No _____

Please check the behaviors most descriptive of the child you are referring to PAR. (Please respond to all questions and feel free to add additional comments whenever appropriate.)

| | Always | Frequently | Seldom | Never | Comments |
|---|---|---|---|---|---|
| 1. Child is able to comprehend and participate in classroom activities with understanding. | | | | | |
| 2. Child prefers to be alone. | | | | | |
| 3. Child appears to be clumsy; trips; falls; drops items; hesitant gait. | | | | | |
| 4. Child is able to understand what is said to him/her. | | | | | |
| 1. Child is able to grasp and release objects easily. | | | | | |
| 2. Child is able to play cooperatively with other children. | | | | | |
| 3. Child appears to tire easily. | | | | | |
| 4. Child exhibits problems of voice, hoarseness, loudness, whisper. | | | | | |
| 1. Child seems to be functioning below actual potential. | | | | | |
| 2. Child sucks thumbs, fingers, bites nails. | | | | | |
| 3. Child has difficulty with fine motor tasks; e.g.: holding crayon, drawing, zipping, buttoning, etc. | | | | | |
| 4. Child speaks with anxiety and apparent anxiety. | | | | | |

PROJECT PAR REFERRAL FORM

| | Always | Frequently | Seldom | Never | Comments |
|---|---|---|---|---|---|
| 1. Child has difficulty in transition periods when asked to change from one activity to another. | | | | | |
| 2. Child is inattentive and not able to consistently attend to tasks. | | | | | |
| 3. Child's body movements appear coordinated. | | | | | |
| 4. Child speaks in complete sentences. | | | | | |
| 1. Child is functioning appropriately to chronological age expectations (Please specify areas of concern). | | | | | |
| 2. Child is hostile and aggressive toward peers. | | | | | |
| 3. Child walks with shuffling gait; exhibits uneven, stiff or uncontrollable movements. | | | | | |
| 4. Child communicates through gestures of body movements rather than through verbal communication. | | | | | |
| 1. Child is able to function without excessive adult supervision. | | | | | |
| 2. Child is able to adjust to classroom limits. | | | | | |
| 3. Child appears to startle easily. | | | | | |
| 4. Child is able to verbally express himself/herself with intelligible speech. | | | | | |

SAGINAW COUNTY
CHILD DEVELOPMENT CENTERS, INC.



PROJECT PAR REFERRAL FORM

PLEASE CHECK ANY FELT NEEDS IN FOLLOWING AREAS (based on your observations and child's Health Record):

Vision_____ Hearing_____

Health_____ Dental_____

Physical Concerns_____

Other (explain)_____ _____

_____

Add any additional information you think would be helpful in area of health:

COMMENTS:

A. Child-Family Relationships:

B. Other

(This form is available to parents upon request.)